Use of the Advanced Technology Program for the development of biomass-conversion technologies

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The Advanced Technology Program (ATP), a program within the U.S. Department of Commerce, provides funding on a cost-shared basis to industry for high-risk/high-payoff R&D on emerging and enabling technologies. The ATP concentrates on technologies that offer significant, broad-based benefits to the nation's economy, but that are unlikely to be developed in a timely fashion without ATP support. Topics for ATP research projects are proposed by industry, and awards are made on both the technical and business merits of the proposed work. Companies of any size may apply, and universities or governmental research institutions may partner with industry in ATP projects. Since its inception, the ATP has participated in 522 projects, representing $3.3B of total industry/government investment. This paper will discuss ATP projects applicable to biomass conversion and review ATP's competition process.

The 14 ATP awards which are directly relevant to biomass conversions involve a cumulative ATP investment of over $37.6 million. As indicated in the list below, seven of these projects (and about 64% of this investment) focused on the development of technologies for the production of specific, biomass-derived products. Three projects (and 19% of the investment) were for the development of platform technologies with applications in agri- & aqua-culture; another three projects (and 12% of the investment dollars) focused on tools that would enable the development of biocatalysts; and one project focused on the development of a specific biocatalyst. To date, two of these projects have led to very successful commercialization outcomes. The Amersham project resulted in the development of a DNA-polymerase enzyme which has become an industry standard for most PCR reactions. And the Cargill project contributed significantly to the creation of the Cargill/Dow joint venture for the production of polylactic acid resins. The paper will present data about how ATP has accelerated R&D for biomass conversions.

Over the last several years, ATP's annual budget has been steady in the range of $200 million, a level which supports about 50-60 new awards each year. Awardees can be single companies (required to cover only indirect costs but limited to $2million) or R&D alliances (no limit on award amount but must cover 50% of total project costs). Single company awardees that are large (Fortune-500 type) companies must cover 60% of total project costs, however.

This year, ATP will accept proposals from January 11, through September 30. Those who submit proposals early in a solicitation enjoy two benefits:

?? if they receive an award, they may avoid a possible delay if ATP has already obligated its budget for new awards; or
?? if they do not receive an award, they may be able to receive an early debrief and resubmit their proposal in the same year.

Extensive information about ATP, the ATP selection process, ATP awards and other resources for high-risk technology development can be obtained through the ATP website: www.atp.nist.gov

ATP Projects applicable to Biomass Conversion

Bio-based Products

- **AgriDyne** – "U.S. Self-Sufficiency in High-Quality Pyrethrin Production"
  $1,200,000 – ATP
  $3,212,000 – total
  10/6/93 – 10/5/95
- **Agracetus** – "Transgenic Cotton Fiber with Polyester Qualities via Biopolymer Genes"
  $1,018,520 – ATP
  $1,168,088 – total
  2/1/95 – 1/31/98
- **Cargill** – "The Development of Improved Functional Properties in Renewable Resource based Degradable Plastics"
  $1,910,034 – ATP
  $3,694,456 – total
  2/1/95 – 1/31/98
- **Mycogen**– "Oleaginous Yeast Fermentation as a Production Method for Squalene and Other Isoprenoids"
  $796,868 – ATP
  $909,015 – total
  9/30/95 – 9/20/98
- **General Electric** – "Synthesis of Monomers"
  $542,117 – ATP
  $1,054,915 – total
  11/15/95 – 11/14/97
- **Genencor** – "Continuous Biocatalytic Systems for the Production of Chemicals from Renewable Resource"
  $15,623,233 – ATP
  $31,309,084 – total
  9/15/95 - 9/14/00
- **Cognis/GE** – "Biosynthesis of Chemical Intermediates"
  $2,978,021 – ATP
  $5,967,978 – total
  1/6/99 – 1/5/02

Agriculture and Aquaculture

- **Agritope** – "Using Biotechnology to Control Fruit Ripening"
  $990,222 – ATP
  $2,800,871 – total
  1/1/98 – 12/31/00
- **Aquatic Systems/Kent Seafarms** – "Superfingerlings: Development of Advanced Biotechnology, Genetic Manipulation, and Animal Husbandry Techniques for use in Aquaculture"
  $1,852,375 – ATP
  $$2,698,636 – total
  3/1/99 – 2/28/02
- **CropTech** – "Enhanced Manufacturing Technologies for Bioactive Proteins and Peptides in Transgenic Tobacco"
  $4,313,796 – ATP
  $8,803,664 – total
  10/1/97 – 9/30/01

Tools for Biocatalyst Development

- **Amersham** – "Hyperthermophilic Microorganisms in Molecular Biology and Biotechnology"
  $1,557,689 – ATP
  $2,396,591 – total
  10/6/95 – 10/5/95
- **Maxygen**– "Whole Genome Shuffling: Rapid Improvement of Industrial Micro-organisms"
  $1,249,760 – ATP
  $3,124,400 – total
  12/1/98 – 11/30/01
- **Dyax** – "Phage Display-Based Platform Technology for Engineering Selective Catalysts"
  $1,700,221 – ATP
  $3,825,497 – total
  11/1/98 – 10/31/01

Biocatalysts

- **Energy BioSystems** – "A Process for Biocatalytic Desulfurization of Crude Oil"
  $1,983,366 – ATP
  $2,619,061 – total
  2/1/95 – 1/31/98